**Remarks**

Claims 55-66 have been amended and new claim 67 has been added. Review and reconsideration in light of this Amendment are respectfully requested.

Claims 55, 59 and 63 are rejected for failing to particularly point out and distinctly claim the invention. Each of claim 55, 59 and 63 specify that the storage deck has a strength sufficient to support at least about 1,750 pounds per square foot. The Office action indicates that it is unclear whether this limitation is intended to be directed to a stress localized point, or a load that is distributed over some area. The Office action also indicates that it is also unclear over what area this load would be applied.

However, this rejection is respectfully traversed, and it is submitted that claims 55, 59 and 63 are sufficient definite. In particular each of claims 55, 59 and 63 specifically indicate that the strength limitation is directed to a distribution over a defined unit of area. For example each of claims 55, 59 and 63 specify strength in terms of a load per square foot. Thus, if the load were to be applied over one square foot, the ramp could support 1,750 pounds. If the load were applied over two square feet, the ramp could support 3,500 pounds etc. The load can be applied in various manners. Because the claim limitation is expressed in lbs/square feet, once the exact nature in which the load is applied it can be easily determined whether the claimed ramp can support the load. Thus it is submitted that claims 55, 59 and 63 are not indefinite, and it is requested that the rejection thereto be withdrawn.

Claims 16-19, 27, 28, 33, 37-40 and 42-44 are rejected as defining obvious subject matter over U.S. Pat. No. 4,325,667 to Freeman in view of the Kalmar web site (cited in the Office action of April 3, 2003) and in view of U.S. Pat. No. 3,691,595 to Backteman et al. Claims 55-66 are rejected as defining obvious subject matter over U.S. Pat. No. 4,400,130 to Anttila in view of U.S. Pat. No. 3,794,196 to Terho.

The Office action indicates that claims 55-66 do not provide any further limitations upon the claimed method, but instead provide apparatus limitations. Accordingly, claims 55-66 have been amended to more clearly indicate that the claims provide limitations upon the claimed

method. Because the amendment is believed to clarify the meaning of the claims and does not raise any new issues (since those claims have already been examined) it is requested that the amendment to those claims be entered.

Turning to the merits of the rejection of claim 55, it is noted that claim 16 (from which claim 55 depends) includes the step of securing the container to the deck. The Office action indicates that the Anttila reference discloses the securing step. Although the Anttila reference generally refers to a ro/ro process, applicant is unable to find any such disclosure in the Anttila reference disclosing that the containers are secured to the deck. Thus it is submitted that claim 16, as well as all claims depending therefrom, distinguish over the Anttila reference.
Claim 16 also includes the step of providing a vehicle including a body portion and a spreader attachment, the gripping portion being capable of being raised and lowered, rotated, and inclined relative to the body portion. However, the device of the Anttila reference does not include a spreader portion. Instead, in the context of shipping it is well known that a spreader is a component specifically designed to grip a container at its corner castings. For example, the attached web page www.portoflosangeles.org/glossary.htm defines a spreader as "equipment designed to lift containers by their corner castings." The attached web page printout http://www.danielislandnews.com/articles/a20000521 containers.htm (at page 3)[1] includes use of the term "spreader" in a manner consistent with the definition.

In contrast, the Anttila reference discloses an assembly which can be utilized to wedge itself under a container 1 to lift the load 1 upwardly (as shown in Figs. 1a and 1d of the Anttila reference). Thus the assembly of the Anttila reference does not lift the container upwardly by the corner castings, and this assembly cannot be considered to be a spreader attachment under the meaning ascribed to that term by one of ordinary skill in the art.

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1 It may be of interest to note that this article, at page 2, briefly discusses the innovation of containerization and its effect upon global shipping. The article correctly notes that Malcolm McLean was the innovator behind containerization; Mr. McLean is also an inventor of this application.

In addition, the Anttila reference does not disclose a gripping portion that is capable of being raised and lowered, rotated, and inclined relative to the body portion. Instead the Anttila reference discloses a bogie assembly 4 which can be moved longitudinally along the length of the load 1, and which can be raised relative to the load 1.

Finally claim 55 specifies that the storage deck has a sufficient strength sufficient to support at least about 1,750 pounds per square foot. The Office action takes the position that it is "notoriously old and well known in the art to make a deck of sufficient strength to support 750 psf." However, claim 55 specifies that the storage deck has sufficient strength to support at least about 1,750 pounds per square foot, not the 750 psf specified in the Office action. Thus the subject matter of claim 55 is not shown in the Office action. In addition, it is submitted that the deck strength specified in claim 55 is not notoriously old and well known in the art, and to the extent official notice is taken of this feature such official notice is traversed. Instead, as specified at page 5, lines 12-14 of this application, this strength is *several times* the strength of the deck of a commercial roll-on, roll-off vessel.

The Office action takes the position that it would have been obvious to one of ordinary skill in the art to increase the strength of the deck in order to maximize the payload which can be carried on the deck and therefore increase revenue. However, the Office action does not produce any reference which discloses the claimed subject matter. In addition, the Office action does not cite to any reference which recites the desirability to increase the strength of the deck. Furthermore, it is submitted that it is not a trivial change to increase the strength of the deck. For example adding additional strength to a deck presumably includes adding additional thickness to the deck, which reduces fuel efficiency and slows transit time. It is submitted that shippers are under great pressure to, in fact, minimize the weight of the barges, which teaches against any such modification.

As previously noted, the high strength of the deck of claim 55 allows the deck to accommodate the high weight of the reach stackers. However, none of the prior art discloses the use of a reach stacker driven onto a barge. Thus it is submitted that the Office action uses the

present application as a template to reconstruct the invention in that there is no independent suggestion to increase the strength of the deck.

Thus because the features of base claim 16 are not shown in the cited art; because the parameters specified in claim 55 are not shown in the Office action, and are not old or notorious, and because the Office action does not provide sufficient motivation for the obviousness rejection, it is submitted that claim 55 is allowable and the rejection thereto is requested to be withdrawn.

Claims 59 and 63 are submitted to be allowable for similar reasons to those outlined above in the context of claim 55. New claim 67 substantially corresponds to claim 55 re-cast in independent form. Thus, it is submitted that new claim 67 is allowable, and an indication thereof is respectfully solicited.

Claim 56 depends from claim 16 and specifies that the marine vessel has a beam at least about ¼ of its length to provide a relatively stable marine vessel. As a preliminary matter, as noted above the Anttila reference does not disclose several limitations of base claim 16 relating to the spreader portion and gripping portion as outlined above. In addition, the Office action takes the position that it is "notoriously old and well known in the art to build a ship with a beam of at least ¼ of the length." However, as noted at page 5, lines 17-24 of the application the beam-to-length ratio specified in claim 56 is approximately double that of a typical ocean going vessel. Thus the position of the Office action in this regard is respectfully traversed, and to the extent official notice is taken of this feature such official notice is traversed. Thus it is requested that the Office provide a reference that discloses the claimed subject matter, provide a motivation to combine the references, etc. in the well-known manner of obviousness rejections.

The high beam-to-length ratio specified in claim 56 provides good stability to the vessel particularly because the vessels must support such high weight loads. For example, a reach stacker with a loaded container carries sufficient weight that, when the reach stacker is first driven on to a vessel, the vessel may have a tendency to tilt, or list, to the side of the reach stacker. The high beam-to-length ratio specified in claim 56 addresses this issue and allows

loaded reach stackers to drive about the deck of the vessel while maintaining the stability of the vessel. Again, it is submitted that since applicant's disclosure teaches the driving of heavy reach stackers onto a vessel, the Office action uses applicant's disclosure as a template to reconstruct applicant's invention from old elements. Thus the subject matter of claim 56 has not been shown in the cited art, and it is submitted that the obviousness rejection of claim 56 should be withdrawn.

Claims 60 and 64 are submitted to be allowable for similar reasons to those outlined above in the context of claim 56.

Claim 57 depends from claim 16 and specifies that the ramp has a length of at least about 75 feet to reduce the angle of inclination of the ramp. Due to the very high weight loads of full containers, as well as the weight of the reach stackers, the ramp should have a low angle of inclination to ensure that the reach stackers can be safely driven over the ramp. The Office action takes the position that it is notoriously old and well known to use a ramp of at least 75 feet in length. However, applicant respectfully traverses this position, and to the extent official notice is taken of this feature such official notice is traversed. In particular applicant submits that the use of the claimed ramp in combination with the other subject matter of claim 57 is not shown in the cited art. Thus it is requested that the Office provide a reference that discloses the claimed subject matter, provide a motivation to combine the references, etc. in the well-known manner of obviousness rejections. Thus, it is submitted that the obviousness rejection of claim 57 should be withdrawn.

Claims 61 and 65 are submitted to be allowable for similar reasons to those outlined above in the context of claim 57.

Claim 58 depends from claim 16 and specifies that the marine vessel is a barge and has a pointed bow. The Office action takes the position that it is notoriously old and well known to use a barge with a pointed bow. However, applicant respectfully traverses this position, and to the extent official notice is taken of this feature such official notice is traversed. Thus it is

requested that the Office provide a reference that discloses the claimed subject matter, provide a motivation to combine the references, etc. in the well-known manner of obviousness rejections.

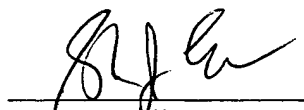
As noted at page 5, lines 19-23 of this application, the pointed bow, in combination with the particular beam-to-length ratio, enables the barge 12 to be towed at speeds up to 50% above those of similar sized barges with the same horsepower tug. The Freeman reference discloses a barge (see Figs. 1 and 2) but the barge shown therein does not include pointed bow. Thus it is submitted that claim 58 defines over the cited references.

Claims 62 and 66 are submitted to be allowable for similar reasons to those outlined above in the context of claim 58.

Thus, in sum, in view of the foregoing it is submitted that the claims define over the cited reference and that the application is in a condition for allowance, and a formal notice thereof is requested.

The Commissioner is hereby authorized to charge any additional fees which may be required by this paper, or to credit any overpayment to Deposit Account 20-0809. Applicant hereby authorizes the Commissioner under 37 C.F.R. §1.136(a)(3) to treat any paper that is filed in this application which requires an extension of time as incorporating a request for such an extension.

Respectfully submitted,



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# GLOSSARY

**Note:**

Many of the shipping terms and definitions in this glossary were found on the U.S. Maritime Administration's website (www.marad.dot.gov), where additional shipping terms are defined. There is no assumption of liability for the contents or use of this glossary, nor is there any implied endorsement of any products.

**A** alongside -- The side of a vessel.

**B** barrel -- A measurement term that refers to 42 gallons of liquid at 60 degrees Fahrenheit (15.56 degrees Celsius).

berth -- The structure where a vessel is secured for the loading and unloading cargo.

bonded warehouse -- A warehouse authorized by customs authorities for the storage of goods on which payment of duties is deferred until the goods are removed.

bow -- The front of a vessel. Also see "stern."

breakbulk cargo -- Loose, noncontainerized products. Examples include steel slabs and coils.

bulk cargo -- Loose cargo shipped in the cargo hold of a vessel without mark and count. Examples include coal, grain and sulfur.

bunker -- A maritime term that refers to fuel used aboard a vessel.

**C** cargo -- Freight loaded into a vessel.

cargo manifest -- A list of all cargo carried on a specific vessel voyage.

cargo tonnage -- Most ocean freight is billed on the basis of weight or measurement tons (W/M). Weight tons can be expressed in short tons of 2000 pounds, long tons of 2240 pounds or metric tons of 1000 kilos (2204.62 pounds). Measurement tons are usually expressed in cargo measurements of cubic feet (one cubic foot equals 0.03 cubic meters) or cubic meters (one cubic meter equals 35.31 cubic feet). Typically, 40 cubic feet (1.13 cubic meters) is the measurement standard.

carrier -- Any person or entity who, in a contract of carriage, undertakes to perform or procure the performance of carriage by rail, road, sea, air, inland waterway or by a combination of such transportation modes.

chassis -- A frame with wheels and container-locking devices in order to secure the container for movement.

container -- A truck trailer body that can be detached from the chassis for loading into a vessel, a railcar, or stacked in a container depot. Containers may be ventilated, insulated, refrigerated, flat rack, vehicle rack, open top, bulk liquid or equipped with interior devices. A container may be 20 feet (6.1 meters), 40 feet

(12.19 meters), 45 feet (13.72 meters), 48 feet (14.63 meters) or 53 feet (16.15 meters) in length, eight feet (2.44 meters) or eight feet, six inches (2.59 meters) in width, and eight feet, six inches (2.59 meters) or nine feet, six inches (2.9 meters) in height.

container freight station (CFS) -- A shipping dock where cargo is loaded ("stuffed") into or unloaded ("stripped") from containers. Container reloading from/to rail or motor carrier equipment is a typical activity.

container terminal -- An area designated for the stowage of cargo in containers. Usually accessible by truck, railroad and marine transportation, the terminal is where containers are picked up, dropped off, maintained and stored.

containerization -- Stowage of general or special cargo in a container for transport in various modes.

containerload -- A cargo load sufficient in size to fill a container either by cubic measurement or by weight.

containerport -- A seaport that features cargo terminals developed specifically to handle marine cargo containers.

**D** dock -- For ships, a cargo-handling area where a vessel normally ties up. For land transportation, a loading or unloading platform at an industrial location or carrier terminal.

doublestack train -- A train using specialized railcars that enable marine cargo containers to be stacked one atop another.

draft -- The number of feet (or meters) that the hull of a ship is beneath the surface of the water.

dry bulk container -- A container constructed to carry grain, powder and other free-flowing solids in bulk. Used in conjunction with a tilt chassis or platform.

dry cargo -- Cargo that is solid in nature and normally does not require temperature control.

**E** export -- Shipment of goods to a foreign country.

**F** feeder service -- Cargo to/from regional ports are transferred to/from a central hub port for a long-haul ocean voyage.

feeder vessel -- A short-sea vessel that transfers cargo between a central hub port and smaller spoke ports.

FEUs -- Maritime abbreviation for "forty-foot equivalent units," which refers to containers that are 40 feet (12.19 meters) in length. One FEU is equal to two TEUs, or "twenty-foot equivalent units." See "TEUs."

flat car -- A railcar without a roof and walls.

flat rack/flat bed container -- A container with no sides and frame members at the front and rear for cargo loading from the sides and top.

foreign-trade zone -- A free port in a country divorced from Customs authority but under government control. Merchandise, except that which is prohibited, may be stored in the zone without being subject to import duty regulations.

free port -- A restricted area at a seaport used for the handling of duty-exempt import goods.

freight -- Refers to either the cargo carried or the charges assessed for carriage of cargo.

freight forwarder -- A person whose business is to act as an agent on behalf of the shipper. A freight forwarder frequently makes the booking reservation.

**G** gateway -- A point at which freight moving from one territory to another is interchanged between transportation lines.

gross weight -- The entire weight of goods, packaging, container and freight car, ready for shipment. Generally, the combined weight limit of the cargo, container and tractor for highway transport is 80,000 pounds (36,287.39 kilograms).

**H** hatch -- The opening in the deck of a vessel, providing access to the cargo hold.

**I** import -- Shipment of goods from a foreign country.

inland carrier -- A transportation line that hauls export or import traffic between ports and inland points.

intermodal-- A shipping term denoting the interchangeable movement of cargo containers between different modes of transportation, primarily ship, truck and train, where the equipment is compatible with the multiple transport systems.

**J** Jacob's ladder -- A rope ladder suspended from the side of a vessel that is used for boarding.

just in time (JIT) -- In this method of inventory control, warehousing is minimal or non-existent: The container is a "movable" warehouse and must arrive neither too early nor too late.

**K** knot -- One knot is equal to one nautical mile (6076 feet or 1851.96 meters) per hour. In the early sailing days, speed was measured by tossing overboard a log secured by a line. Knots were tied into the line at intervals of approximately six feet (1.83 meters). The number of knots measured was then compared to the time required to travel the distance of 1000 knots in the line.

**L** laden -- Loaded aboard a vessel.

landbridge -- The movement of cargo, by water, from one country through the port of another country, by rail or truck, to an inland point in that country or to a third country. For example, cargo from Japan is landbridged across the United States to France.

liquid bulk -- Cargo that is fluid in nature and typically transported in tankers. Examples include oil and other petroleum products.

longshoreman -- An individual employed in a port to load and unload cargo vessels.

loose -- Without packing.

**M** maritime -- Business pertaining to commerce or navigation transacted upon the sea or in seaports.

meter -- One meter is equal in length to 3.28 feet or 39.37 inches.

metric ton -- One metric ton is equal in weight to 2204.62 pounds or 1000 kilograms.

mile -- One mile is equal to 5280 feet or 1.61 kilometers on land. Also see "nautical mile."

mini-landbridge -- An intermodal system for transporting containers by ocean and then by rail or motor to a port previously served as an all-water move. For example, cargo from China is mini-landbridged through Seattle to New York.

multimodal -- Synonymous with "intermodal" for all practical purposes.

**N** nautical mile -- One nautical mile is equal in length to 607,612 feet or 1.85 kilometers, which is the distance of one minute of longitude measured at the equator. Also see "mile."

near-dock railyard -- A cargo facility used primarily to sort marine cargo containers and assemble into trainloads bound for common destinations. These railyards are located inland, in close proximity to a port waterfront.

non-vessel operating common carrier (NVOCC) -- A cargo consolidator in ocean trades that will buy space from a carrier and subsell it to smaller shippers. The NVOCC conducts itself as an ocean carrier, except that it will not provide the actual ocean or intermodal service.

**O** on-dock railyard -- A cargo facility used primarily to sort marine cargo containers and assemble them into trainloads bound for common destinations. These railyards are locate on a port waterfront.

origin -- The location where a freight shipment begins its movement.

overheight cargo -- Freight that is more than eight feet high, or too tall to fit into a standard container.

**P** pallet -- A platform with or without sides, on which a number of packages or pieces may be loaded to facilitate handling by a forklift or similar functioning equipment.

pier -- The structure where a vessel is secured for the loading and unloading cargo.

piggyback -- A transportation arrangement whereby truck trailers and their loads are carried and moved by train to a destination.

port -- There are three common definitions:

1. A harbor with piers or docks.

2. The left side of a ship when facing the bow. Also see "starboard."

3. An opening in a vessel's side, used for handling freight.

port of call -- A port where a vessel discharges or receives freight.

port of entry -- A port where cargo enters a country and is unloaded.

port of exit -- A port where cargo is loaded and leaves a country.

**Q** quay -- A structure attached to land to which a vessel is moored. Also see "berth," "dock" and "pier."

**R** ramp -- A railroad terminal where containers are received or delivered and trains are loaded or discharged.

reefer -- An industry term for a refrigerated or temperature-controlled container.

relay -- The transfer of containers from one ship to another when both vessels are controlled by the same network (carrier) manager.

revenue ton -- A ton measurement on which shipments are freighted. If cargo is rated as weight or measure (W/M), whichever produces the higher revenue will be considered the revenue ton. Weights are based on metric tons and measures are based on cubic meters. Hence, one revenue ton is equal to one metric ton (2204.62 pounds) or one cubic meter (35.31 cubic feet).

roll-on roll-off (Ro/Ro) -- A method of ocean cargo service using a vessel with ramps, which allow wheeled containers, trailers or vehicles to be loaded and unloaded without the use of cranes.

**S** service -- A string of vessels that makes a particular voyage and serves a particular market.

ship chandler -- An individual or company selling equipment and supplies to ships.

shipper -- The person or company who usually is the supplier or owner of commodities shipped. Also called the consignor.

ships --There are nine basic types of ships:

1. barge carriers -- Ships designed to transport barges.

2. bulk carriers -- All vessels designed to carry bulk cargo, such as grain, fertilizers, ore, and oil.

3. combination passenger and cargo ships -- Cargo vessels with the capacity for 13 or more passengers.

4. freighters -- Comprises refrigerated and unrefrigerated breakbulk vessels, containerships, partial containerships, roll-on roll-off vessels, and barge carriers.

5. full containerships -- Vessels equipped with permanent container cells for container storage, with little or no space for other types of cargo.

6. general cargo carriers -- This category includes breakbulk freighters, car carriers, cattle carriers, pallet carriers and timber carriers.

7. partial containerships -- Multipurpose containerships with one or more, but not all, cargo compartments fitted with permanent container cells. The remaining compartments are used for noncontainerized cargo.

8. roll-on roll-off vessels -- Specialized ships designed to carry wheeled containers, trailers and vehicles using onboard ramps.

9. tankers -- Ships fitted with tanks for storage of liquid cargo, such as crude petroleum and petroleum products, chemicals, liquefied gas, wine, and

molasses.

short ton -- One short ton is equal in weight to 2000 pounds or 0.91 metric tons.

side loader -- A lift truck fitted with lifting attachments operating on one side for handling containers.

slip -- A ship's berth between two piers.

spreader -- Equipment designed to lift containers by their corner casters.

stack car -- An articulated five-platform railcar that allows containers to be doublestacked one atop another.

stack train -- A rail service whereby railcars carry containers doublestacked on specially operated unit trains.

starboard -- The right side of a ship when facing the bow. Also see "port."

stern -- The end of a vessel. Also see "bow."

stevedore -- A person or company that employs longshore workers and establishes agreements to load or unload ships.

stowage -- A marine term that refers to loading freight into vessels' cargo holds.

straddle carrier -- Mobile truck equipment that is capable of lifting containers within its own framework.

supply chain -- A logistical management system that integrates the sequence of activities from delivery of raw materials to the manufacturer to delivery of the finished product to the customer. "Just in time" is an example of supply chain management.

T tariff -- A publication that sets forth the charges, rates and rules of ports and transportation companies.

terminal -- An assigned area where containers are prepared for loading into a vessel, train or truck, or are stored immediately after discharge from the vessel, train or truck.

TEUs -- Maritime abbreviation for "twenty-foot equivalent units," which refers to containers that are 20 feet (6.1 meters) in length. Two TEUs are equal to one FEU. Also see "FEU."

transship -- To transfer goods from one transportation line to another, or from one ship to another.

turnaround -- In water transportation, the time between the arrival and departure of a ship from a port.

U unit load -- Packages loaded onto a pallet, in a crate or any other way that enables them to be handled at one time as a unit.

unit train -- A train comprising a specified number of railcars that remain together as a unit until reaching a designated destination.

unitization -- The consolidation of a quantity of individual items into one large

shipping unit to facilitate handling. Also: The loading of one or more large items of cargo onto a single piece of equipment, such as a pallet.

**V** vanning – A marine term for stowing cargo in a container.

**W** warehouse -- A place for the reception, delivery, consolidation, distribution, and storage of cargo.

warehousing -- The storage of cargo.

weights and measures --

1. One cubic meter is equal to 35.31 cubic feet.
2. One long ton, or gross ton, is equal to 2240 pounds or 1016.05 kilograms.
3. One measurement ton is equal to 40 cubic feet or one cubic meter.
4. One metric ton, or kilo ton, is equal to 2204,62 pounds or 1000 kilograms.
5. One short ton, or net ton, is equal to 2000 pounds or 907.18 kilograms.

**X**

**Y** yard – This term commonly refers to a railroad yard with many railtracks for assembling, storing or switching freight trains.

**Z**

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## Trailers changed industry

By TONY BARTELME
Of The Post and Courier staff
Sunday, May 21, 2000

At first glance, the shipping container seems a simple thing - 5,000 pounds of steel bars and corrugated panels welded into a six-sided box.

But this clunky, mundane object has had a huge impact on how and where we live and work, what we eat and what we pay for cars, toasters, computers and millions of other items we use every day.

The origins of some of the community's more notable controversies - the fight over the Global Gateway terminal and the January waterfront riot - ultimately can be traced to the widespread use of standard-sized shipping containers.

Stacked like giant Lego blocks on massive ships, or hauled by countless trucks, they contain the world's commerce: chocolate, log homes, body bags, semiconductors, condoms, asparagus, you name it. Sometimes they are home to stowaways or drugs.

Open the heavy steel doors to a container and you might discover a portable hospital laboratory inside, complete with scalpels and blood pressure machines. Or, you might find a tank full of chemical dyes or milk. Not long ago, a company used containers to build a portable, artificial wave machine for surfing exhibitions.

In fact, the humble shipping container is one of the more important inventions in the history of modern transportation, the grease that keeps the global economy's wheels spinning. "I'd put it up there with the introduction of steam-powered vessels," said Gerhardt Muller, a professor at the U.S. Merchant Marine Academy. "It would be hard to imagine the world today without containers."

North Charleston happens to be home to North America's largest container manufacturing factory, the Charleston Marine Containers Inc. plant at the old Navy base. And one recent afternoon, Bill Brassington, strolled through the factory, past steel bars and panels that someday will be turned into containers for the military.

Yes, he conceded, the container is not particularly sexy. "When I go to a party and I say 'I'm in containers,' people turn around and talk to somebody else," he said with a wry smile.

But Brassington clearly has a soft spot for these hard metal boxes and knows more about them than most. A bearded and amiable engineer from Wales, he works for the factory's parent company, GE SeaCo Services, which owns more than a million containers worldwide and leases them to shipping lines.

He has been to nearly all the world's container factories, most of which are in China. He helped design new kinds of containers. Sometimes when he spies one, he finds himself studying how clean the welds are and where it was built.

"Yeah, it may just be a metal box to most people, but there's a lot to that metal box."

He motioned toward a bright red container in the parking lot. "Here is a standard 20-foot box. This is where it all started from," he said, opening the container's doors and walking inside, his voice echoing off the corrugated walls. "It's what we call a TEU, a 20-foot equivalent unit."

Just as watts measure the power of light bulbs, the TEU is the shipping industry's standard of measurement. Containers today generally come in two sizes - 20- and 40-foot versions, so a 40-footer is equivalent to two TEUs. Both 20- and 40-footers are eight feet wide and 8 1/2 feet high.

"There are about 2 1/2 tons of steel for a 40-foot container," Brassington continued. "It's the same kind of steel used to build the Golden Gate Bridge. It gets rusty on the outside, but doesn't rust all the way through."

Containers are tough, built to protect their contents from the stinging spray of the North Atlantic, a tired crane operator who might drop it too hard onto a truck chassis, or the bumps of a cross-country road trip.

Each corner can withstand 96 tons of pressure, the equivalent of five fully laden containers. The floors are a rugged plywood, usually from Indonesia, and able to hold 350 pounds per square inch. Sometimes that's not strong enough, though.

Brassington recalled when a 20-ton slab of marble burst through a container's floor as the box was lifted, like a milk carton in a wet paper grocery bag. "The stone went through the barge's hull and presumably to the bottom of the sea."

As he stepped outside the container, Brassington pointed to the corner. "This is a corner casting." Slightly smaller than a car battery, it had two holes on the side and one on the top.

Every shipping container has eight corner castings. They allow specially designed cranes to quickly clamp onto a box, lift it off a ship and drop it onto a truck or rail car.

The corner casting, Brassington said with a flourish, "is the whole secret of containerization."

**The container revolution**

The shipping container is nothing new. Fourteen hundred years before the birth of Christ, the Greeks used two-handled jars called amphoras to move olives, oil and wine.

Until a few decades ago, moving cargo on and off ships remained a sluggish process. Goods were loaded on pallets using slings, slow-moving cranes and the muscles of hundreds of longshoremen. Loading and unloading a ship could take a week or longer.

Pilfering was a problem. A shipper moving whiskey and other high-value cargo might lose a quarter to thieves.

Then, in 1956, Malcolm McLean, a truck driver from Fayetteville, N.C., found himself waiting to unload bales of cotton at a North Carolina port. He watched the dockworkers muscle each crate and bundle off the trucks and into slings.

"Suddenly," he said in a 1994 magazine interview, "the thought occurred to me, wouldn't it be great if my trailer could simply be lifted up and placed on the ship without its contents being touched."

McLean started a company, eventually named SeaLand Service, that used ships to haul truck trailers across the ocean. Over time, those converted truck trailers evolved into sturdy metal containers.

This may not seem like much of an innovation. But with the advent of containerization, a huge amount of cargo could be loaded by just a handful of men in just a few hours. Because the boxes were sealed and locked, pilferage rates declined dramatically.

Suddenly, moving goods across the ocean became fast, secure - and cheap. Today, shipping a container of turkey feathers to Hong Kong from Charleston costs less than $1,200, a load of 84 lawn mowers to Europe about $1,000. It only costs 1 cent to bring a bottle of beer to the United States.

Understandably, factory owners loved containers. The cost of shipping a $300 television set is $3, 1 percent of its final cost. Several decades ago, the transportation cost would have been $40 or more.

In time, the container became, said Bill DeWitt, University of Maryland logistics professor, "the fundamental building block of international commerce."

**Change the world**

The ability to move goods quickly and cheaply across the oceans had tremendous economic and social ramifications.

A company wanting to bolster its bottom line can move its factory to countries where labor costs are low. As long as the plant is near a road or railway to a port, this company will be able to obtain raw materials and bring its finished products to almost any place in the world.

In other words, a textile plant in Malaysia may be just as accessible as one in Kingstree.

This has had wrenching effects on U.S. communities that saw jobs float away to Mexico, Asia and other less-developed parts of the world.

On the other hand, it's been a boon to companies like Southland Log Homes of Irmo, the largest U.S. exporter of log homes.

"Our product is like a bunch of Lincoln Logs, and we put bundles of them in containers," said Joe Taylor Jr., the company's president. "We can send a home to Japan, complete with bricks for the foundation, in three 40-foot containers."

The company will send about 65 to 80 homes overseas this year, most of them to Asia. Transportation costs are minimal - about $200 to truck a container to Charleston and another $1,200 to ship it from the port to Japan.

"I can send a container to Tokyo cheaper than I can ship one to California," Taylor said. "I pick at people all the time about how small the world is becoming."

The U.S. container manufacturing business hasn't fared as well as Taylor's log home business.

In the 1950s and 1960s, most containers were fabricated in the United States.

Today, nearly 87 percent are made in China and other Far Eastern countries, according to Containerisation International's 2000 Yearbook, an industry guide.

Often in remote farming areas, these factories employ hundreds of people and pump out containers every eight to 12 minutes. The average price for a 20-foot box is just $1,450.

Just 2 percent of the world's containers are made in the United States. To survive, U.S. factories such as Charleston Marine Containers produce custom-made containers for the military or containers designed for specific types of cargo, such as power generators.

"When you are competing with someone who is paid about $3 an hour to do this work and in facilities that don't require health and safety stuff, it's no wonder that all the work is going overseas," Brassington said. "That's not to say they don't make good containers. It's just reality."

**On the Waterfront**

The emergence of the container also has transformed coastal and river landscapes across the planet.

A container terminal is a gritty place of large geometric forms, a place of hard, straight edges and rectangles. Containers are stacked neatly in rows, piled high like a child's sugar cube project. Curves are mostly limited to the bows of the giant container ships and the hard hats worn by the longshoremen and stevedores.

Roughly 350 ports regularly handle containers, and Charleston is one of the world's busiest, ranked number 32 in 1998. Last year, more than 1.2 million TEUs moved through the State Ports Authority's terminals in Charleston - fourth most in the nation. The port's biggest shipper is Michelin, which last year imported nearly 200 million pounds of rubber from Southeast Asia, most of it in containers.

Perhaps the most dominant feature of a container port is the container crane.

Resembling giant robotic dinosaurs, the largest container cranes are more than 300 feet tall when their arms are raised. A new one costs $6.25 million. They inspired those long-legged machines operated by the Evil Empire in the beginning of "The Empire Strikes Back." The SPA has 19 cranes in all and four more on order. They are among the tallest structures in Charleston.

The people who run these 900-ton machines are the cowboys of the container age, flinging boxes as heavy as buses on and off ships. Perched 100 feet above the container yard and staring through windows below their feet, a container crane operator must have special powers of concentration, not to mention good eyesight and depth perception.

In a typical "move," an operator flips levers and switches, causing a crane's spreader bar to drop toward a container on a ship. It slams onto a container, metal against metal, with a crack that sounds like distant artillery fire. The spreader bars then clamp into a container's corner castings.

Up goes the container, then back down toward a waiting truck chassis. If a container operator flicks one lever too much or too little, he could drop a box on a person instead of a truck chassis.

The work goes on in a numbing hypnotic ballet. Lift a box, drop it on the truck, lift a box ... Crane operators like to joke that it's like sitting on a toilet for hours and flushing over and over.

When the gears are meshing and the crane operators, yard crews and longshoremen are in a groove, they can move 30-ton boxes onto trucks every minute or so. Once, they moved an average of 67 containers in an hour, which the State Ports Authority says is a world record.

**Longshoreman's coffin**

Longshoremen, the people who work under these cranes, have a love-hate relationship with containers.

The advent of containerization caused thousands to lose their jobs, triggering strikes and other clashes around the world. The container, union leaders liked to say, was "the longshoreman's coffin."

You don't hear that complaint anymore. To compensate for job losses, longshore unions forced shipping lines to pay high rates when dockworkers handle containers. Longshoremen who survived the emergence of the container now do pretty well.

In the busy West Coast container ports, for instance, a full-time longshoreman makes an average of $101,500 per year, a foreman $160,832, according to a recent survey. A dockworker in Charleston with seniority and overtime also can earn $100,000 in a year.

These high-wage jobs were at stake in the recent conflict between the International Longshoremen's Association and the Danish shipping line, Nordana.

When Nordana decided to use non-union dockworkers to handle containers in December, union longshoremen considered it a serious threat to their livelihoods, eventually leading to the violent waterfront riot Jan. 20. Under pressure, Nordana eventually switched back to union dockworkers.

Longshoremen are both proud and sensitive about their wages, and they're quick to note that most people don't work in offices with 20-ton weights swinging over their heads. Indeed, it sometimes seems silly that longshoremen wear hard hats.

Every now and then, a container will fall with a hellacious crash, and on occasion, someone will be underneath it. A couple of years ago, a container holding 17,572 pounds of rolled paper from northern Europe fell on a longshoreman in Charleston, crushing him to death.

Sometimes, a longshoreman or ship crewman might find an unwelcome surprise in a container. In recent years, stowaways from China have slipped into containers, spending three weeks or more in dark, damp, prisons on their way to the West Coast. In January, three stowaways were found dead in a container in Seattle.

Sometimes, containers are used for other illicit purposes. Two years ago, federal agents found 3,000 pounds of cocaine worth $37.5 million in a container at the Wando Welch Terminal. More often than not, U.S. Customs agents seize less exotic items, such as counterfeit jeans, unsafe fireworks or bogus auto parts.

Most of the time, dockworkers never touch what's inside a container, but they will occasionally stuff containers on the terminal or in nearby warehouses.

Local longshore leader Ken Riley remembers loading a container during the Persian Gulf War. "It was a container full of body bags," he said. "That one I'll never forget."

**flo Super containerships**

In addition to the container crane, containerization spawned another impressive machine - the container ship.

The newest vessels cost more than $100 million and can lug the equivalent of 7,200 20-foot boxes. Their massive diesel engines generate 75,000 horsepower.

More than 1,000 feet long and too big to fit through the Panama Canal, these ships are run by just 16 or so people and can carry cargo worth $300 million or more. They cost $6,000 per hour

or more to run.

There's talk in shipping circles about ships that someday may carry 15,000 TEUs.

Shipping lines are building these floating container islands because world trade is expected to double in the next two decades.

Container ports across the country are spending vast sums to make sure they can handle these big ships - more than $6.5 billion from 1997 to 2001 on expansion projects, according to the U.S. Maritime Administration.

The State Ports Authority is spending $160 million on new container handling equipment and other improvements to its container terminals. And the agency wants to build a huge new container terminal on Daniel Island, the so-called Global Gateway. Its price tag has been pegged at $1.2 billion, though even port officials say that figure may be low.

The Global Gateway plan has triggered intense opposition from lawmakers, environmentalists and residents' groups who say the terminal will destroy the area's quality of life. Opponents have plastered their cars with bumper stickers saying "Contain The Port" and "No Mo Pote."

Some people, especially in North Charleston, despise containers. In recent years, private container storage yards have popped up throughout the area.

"They're reaching to the sky now, must be 10-high now, and they look like the Tower of Babel," said Florence Frail of North Charleston. "They must have rats and vermin in there, or spiders. Think of the diseases they can bring in. Those containers are horrible."

Jane O'Dell is another container foe from North Charleston.

"I realize they have a use and they're necessary, but what is it they say - not in my back yard," she said. Sentiment toward containers is so negative that the city passed an ordinance prohibiting anyone from handling containers at the former Navy base.

"The feeling is that North Charleston is the dumping ground for containers," O'Dell said. "They have not been controlled or regulated, and we worry about the getting higher and spreading. Those stacks are marring the scene."

**What lies ahead**

If anything, containers will become even more visible.

Already, there are about 12 million in the world, and factories are pumping out 1.4 million new ones every year.

The industry's main challenge is to find ways to stuff odd-sized cargo in containers, such as a 10,000-pound circus elephant.

Seabox, a container manufacturer in New Jersey, recently found a way to do this. The company also has turned containers into portable laboratories, complete with bunks and an escape hatches. Several years ago, Seabox built a giant portable movie screen in New York City's Central Park by stacking 180 containers 10 high for the premier of Disney's animated movie Pocahontas.

Not long ago Seabox and Charleston Marine Containers teamed up to create the world's only mobile surfing machine.

With seven 40-foot containers creating a pool, the machine's four jet engines pump 1,000 gallons of water a minute to form a surfer's dream wave. The contraption is being sent around the world for surfing contests.

"We took an unusual idea and made it transportable," said David Wall, vice president and general manager of Charleston Marine Containers. "That's the way I think containers are going to go."

Back at the Charleston Marine Containers plant, Brassington walked past green specialty boxes for the military.

Brassington sees a day when companies load containers with items as they roll off the assembly line. These containers could then be shipped directly to stores, bypassing warehouses and distribution centers.

The Internet will be an integral part of inventory control, and containerized goods will be tracked second-by-second with global telecommunication systems. A world full of mobile warehouses.

"It's a really unusual industry in that it's so simple and so practical," Brassington said.

Still, with the advent of containerization, some of the gritty romance of the waterfront has been lost.

No longer do you see the bales of cotton and bags of coffee dragged onto ships by burly, sweat-soaked longshoremen with hooks. A container full of coffee looks like a container carrying a log home or a surfing machine.

Instead, a global transportation has been created that has made it possible to get fresh asparagus from South America when American asparagus fields are fallow and made plastic toys from Taiwan as cheap as water. And as the population swells and trade increases, those boxes at the port stacked two high now will only grow higher - steel monuments to a smaller and smaller world.

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